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New faunistic records and confirmation of the status of *Sitochroa verticalis* ssp. *albalis* from SE Turkey (*Lepidoptera*, *Pyraloidea*)

Muhabbet Kemal¹ Sibel Kızıldağ Ahmet Ömer Koçak

Abstract: New faunistic records and confirmation of the status of *Sitochroa verticalis* ssp. *albalis* from SE Turkey (*Lepidoptera*, *Pyraloidea*). *Misc. Pap.* 173: 1-4, 1 fig., 1 map.

In this paper, occurrence of *Sitochroa verticalis* ssp. *albalis* is discussed. A new provincial record is given. Taxonomical status is confirmed here by the evaluations of DNA barcodes, and the external morphology of new material.

Keywords: *Lepidoptera*, *Pyraloidea*, *Sitochroa verticalis albalis*, fauna, Hakkari, Turkey, MtCOI.

The genus *Sitochroa* was established by Hübner (1825) with the type species, *Pyralis palealis* Denis & Schiff., 1775. The valid genera of the *Pyralidae* of Turkey were updated and listed by Koçak & Kemal (2015).

Sitochroa species are widely distributed in Central and West Turkey. However, in SE Turkey, the species *verticalis* and *palealis* are rather rare. For example, *Sitochroa verticalis* is recently reported from Van Province by the authors in the alpine zone. The population, which is remarkably different from the typical *verticalis* was described as *albalis*.

In the present paper, the species is reported here from three localities in Hakkari Province for the first time. All the specimens collected by day and night carry constant diagnostic characters of *albalis*. The field studies in Hakkari, realized by the authors in mid-May between 17-20.v.2018, is the first attempt within the Cesa project entitled “Lepidoptera fauna of Zap Valley (Hakkari Province, SE Turkey (LZV))”².

Sitochroa verticalis ssp. *albalis* Kemal & Koçak, 2017

Sitochroa verticalis ssp. *albalis* Kemal & Koçak, 2017, *Cesa News* 130: 38, fig.95. Holotype ♂. Turkey, Van Province, Bahçesaray Krapet Pass 2820m, 6 viii 2016, M.Kemal & A. Koçak leg. (Cesa)

Habitat: Variable, but mainly mountain steppe.

Range: The subspecies *albalis* is confined to SE Turkey: Diyarbakır (Kulp), Van (Çatak, Bahçesaray), Hakkari (Sümbül Mt., Dez Valley). Another subspecies *nigriciliialis* Ragonot (1895),

¹ Dr. Muhabbet Kemal & Dr. Sibel Kızıldağ - Van Yüzüncü Yıl University, Faculty of Science, Dept. of Biology, Campus, Van / Turkey. e-mails: muhabbet_kemal@yahoo.com.tr - sibelkizildag@yyu.edu.tr

Prof. em. Dr. Ahmet Ömer Koçak, c/o Yüzüncü Yıl University, Faculty of Science, Dept. of Biology. e-mail: cesa_tr@yahoo.com.tr

² <https://www.researchgate.net/project/Lepidoptera-fauna-of-Zap-Valley-Hakkari-Province-SE-Turkey-LZV>

considered validly by Leraut (2005) occurs in South Turkey: Hatay Prov. (Akbes), and Kahramanmaraş Prov. (Süleymanlı). *Sitochroa verticalis* (L.) is currently represented in Central, North and West Turkey by the nominate subspecies.

Vertical distribution: 880-3000m.

Adult phenology and flight: May-August; mainly nocturnal, also diurnal. The species is represented in the lowlands by two generations in a year (Slamka, 2013). However, at the upper heights, for example Krapet Pass (3000m.) (Van Pr., SE Turkey), the species is represented by the subspecies *albalis*, by a single annual generation. The studies about the existence of *albalis* in SE Turkey is ongoing.

Molecular Analyses: For mtDNA data analysis, the Kimura-2-parameter model (Kimura, 1980) was used for molecular distance estimate. Additionally, mean pairwise p-distances among populations were calculated in MEGA v. 7.0 (Kumar et al., 2016). In *S. verticalis* both Italian and Austrian populations are closely related, with only 0.3% of mitochondrial divergence (mean p-distance) and clustered in same clade. But, *S. verticalis albalis* was placed basal to the cluster formed by other *S. verticalis* in Neighbor joining tree and the values of pairwise genetic distance between presented population in this study and others range from 0.5% to 0.6%, indicating low genetic differentiation for species level. Our results indicate that the subspecies can be successfully identified by mitochondrial marker, which confirm the previous morphological classification. On the other hand, populations of *S. palealis* show 6.3% of mitochondrial divergence from those of *S. verticalis*.

Phenotypic plasticity is the ability of a single genotype to produce distinct phenotypes based on environmental cues experienced during development, such as temperature, nutrition, or exposure to sunlight (Everett et al., 2012). The morphological differences in *Sitochroa verticalis albalis* such as the wing colour may be the result of phenotypic plasticity. Molecular analyses support that our population differs considerably from others, even at the sub-species level. Clearly, mt COI gene sequences for more populations of *Sitochroa verticalis* are required in order to elucidate the systematics of the species/subspecies.

Status: The taxon was morphologically described as a subspecies of *Sitochroa verticalis* (Linnaeus, 1758) by the authors (Kemal & Koçak, 2017). New findings reveal that the discriminating features are genotypic and appears constantly, not only in the subsequent populations in the same place, but also from different habitats of different geographical addresses in SE Turkey. The present records from Hakkari Province confirm our original proposal about the taxonomical position of *albalis*. The difference at subspecific level between typical *verticalis* and *albalis* has also been confirmed here by the DNA barcode evaluation.

New material studied (total 8 ♂): 2 ♂. Van Province, Bahçesaray Krapet Pass 3000m 16.vii.2017, light trap, nocturnal; 2 ♂. Hakkari Province, Kırıkdağ Dez valley 1750m, 19.v.2018, diurnal; 1 ♂. Kırıkdağ 1475m, 20.v.2018, light trap, nocturnal; 3 ♂. Eastern parts of Sümbül Mt. 1625m, 20.v.2018, light trap, nocturnal, all M. Kemal & A. Koçak leg. (coll. Cesa).

Process ID (Fasta): Sit001. TR, Van Province, Bahçesaray Krapet Pass 3000m, 16.vii.2017, M. Kemal & A. Koçak leg. (coll. Cesa).

Notes: In order to compare the mtCOI gene sequence of *Sitochroa verticalis albalis*, we used the publicly available information of *Sitochroa verticalis verticalis* in the the Bold Systems (Fig.1)

References

- Everett, A., Tong, X., Briscoe, A. D. & A. Monteiro, 2012, Phenotypic plasticity in opsin expression in a butterfly compound eye complements sex role reversal. *BMC Evolutionary Biology* 12 (232): 1-11.
- Felsenstein J., 1985, Confidence limits on phylogenies: An approach using the bootstrap. *Evolution* 39: 783-791.
- Hübner, J., 1816-[1826], *Verzeichnis bekannter Schmetterlinge*. 431 pp., Augsburg.
- Kemal, M. & A.Ö. Koçak, 2017, New and little known Pyraloidea of Turkey, with some faunistical notes (Lepidoptera). *Cesa News* 130: 1-43, 103 figs.
- Kimura M., 1980, A simple method for estimating evolutionary rate of base substitutions through comparative studies of nucleotide sequences. *Journal of Molecular Evolution* 16: 111-120.
- Koçak, A.Ö. & M. Kemal, 2015, List of the genera of *Pyralidae* of Turkey (Lepidoptera). *Cesa News* 114: 1-19.
- Kumar S., Stecher G. & K. Tamura, 2016, MEGA7: Molecular Evolutionary Genetics Analysis version 7.0 for bigger datasets. *Molecular Biology and Evolution* 33: 1870-1874.
- Leraut, P., 2005, Contribution a l'étude de quelques genres et espèces de Pyraustinae (Lepidoptera, Crambidae). *Nouv. Revue Ent. (n.s.)* 22 (2): 123-139.
- Linnaeus, C., 1758, *Systema Naturae per regna tria naturae secundum classes, ordines, genera, species cum characteribus, differentiis, synonymis, locis. ed. decima reformata*. Tom.1, 823 pp. Holmiae.
- Ragonot, E.L., 1895, Microlépidoptères de la Haute-Syrie récoltés par M. Ch. Delagrangé, et descriptions des espèces nouvelles. *Bull. Soc. ent. Fr.* 1895: xciv-cix.
- Saitou N. and Nei M., 1987, The neighbor-joining method: A new method for reconstructing phylogenetic trees. *Molecular Biology and Evolution* 4:406-425.
- Slamka, F., 2013, *Pyraloidea of Europe vol.3 Pyraustinae & Spilomenidae*. Bratislava.

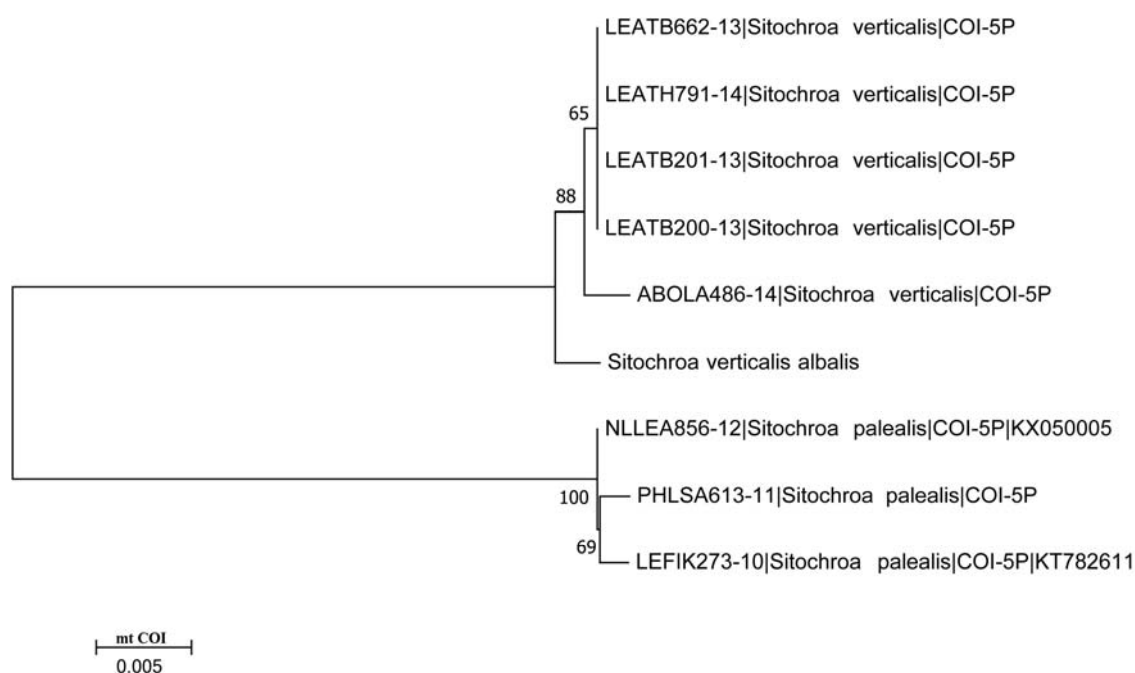
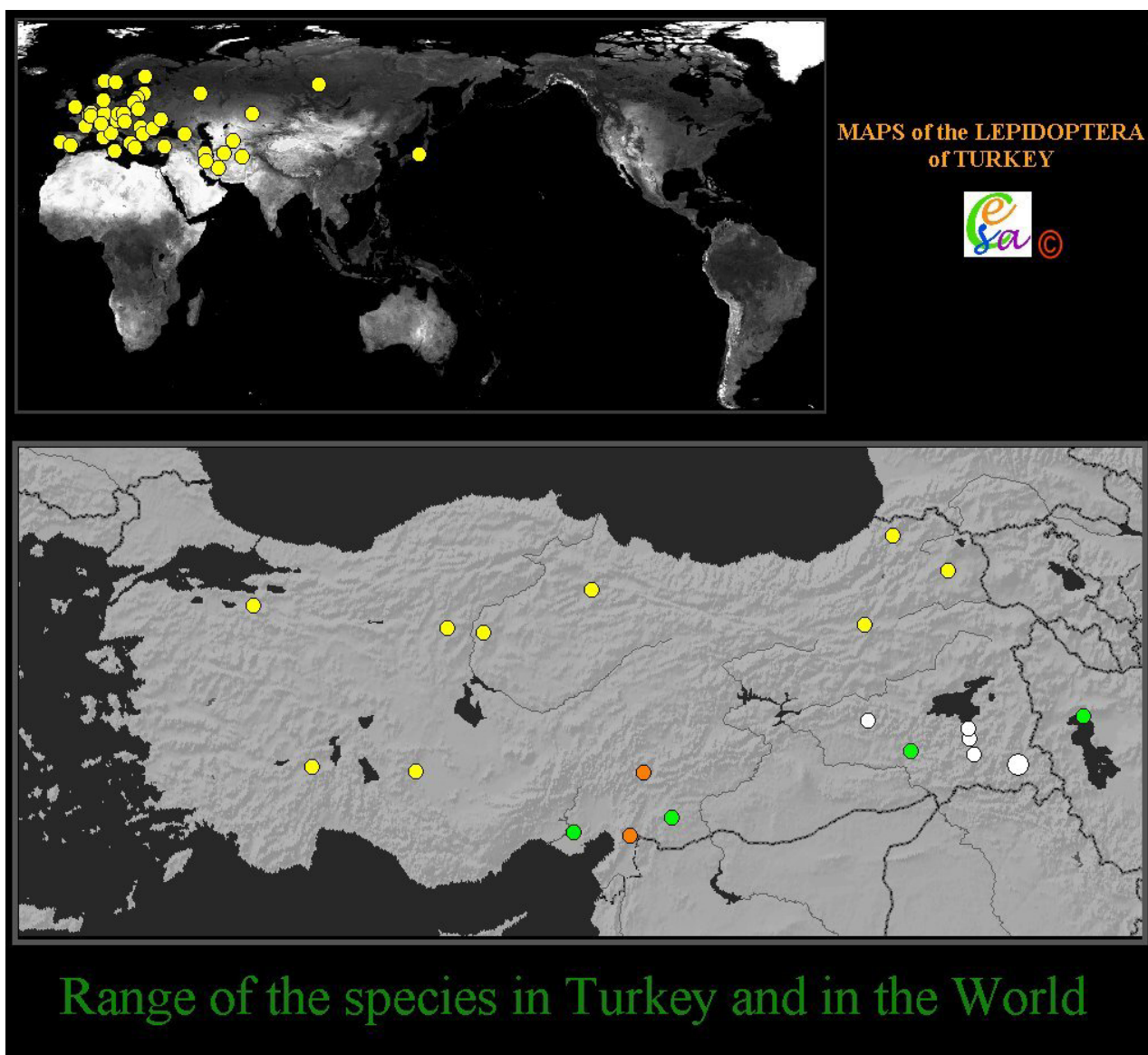


Fig. 1 - Evolutionary relationships of *Sitochroa verticalis* populations based on mtCOI gene sequence.

The evolutionary history was inferred using the Neighbor-Joining method (Saitou & Nei, 1987). The percentage of replicate trees in which the associated taxa clustered together in the bootstrap test (1000 replicates) are shown next to the branches (Felsenstein, 1985). The tree is drawn to scale, with branch lengths in the same units as those of the evolutionary distances used to infer the phylogenetic tree. The evolutionary distances were computed using the Kimura 2-parameter method (Kimura, 1980) and are in the units of the number of base substitutions per site. Evolutionary analyses were conducted in MEGA7 (Kumar et al., 2016) and *S. palealis* populations were used as outgroup.



Map 1 – *Sitochroa verticalis*. Yellow= *verticalis*, orange= *nigricilialis*, white= *albalis*, green: control is required. Large white denotes new records from Hakkari Province, containing three different localities.

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